AR-9

July 16, 1999

NOTE

SUBJ: TMDL Review - Spokane River Dissolved Metals, WA

TO: Allen Henning, Washington TMDL Coordinator
US EPA Region 10

FROM: Chris Zabawa, AWPD/WB (4503-F)
Myra Price, AWPD/WB (4503-F)

Re: Spokane River Dissolved Metals TMDL
Submittal Report & Recommendations for Total
Maximum Daily Loads and Waste Load Allocations
Final TMDL
May 1999

A review which you requested of the above-referenced document is furnished as an attachment.

The analytical document submitted for our review represents a good effort. Our principal comment is that the results are expressed as end-of-pipe concentrations, instead of loads. The analytical document contains the information necessary to complete the TMDL analysis by computing the loads, but the loads have not been explicitly expressed.

The WLA's will also have to be presented for individual dischargers in the approved TMDL.

If you have any questions concerning the comments in the attachment, please do not hesitate to contact us at 202-260-7101 (Chris) or 202-260-7108 (Myra).

Thank you for giving us the opportunity to review and comment on this TMDL.

cc: Donald J. Brady, Chief, AWPD/WB
Bruce Cleland, TMDL Coordinator, USEPA Region X
Russ Kinerson, Chief, Exposure Assessment Branch,OW/OST (4305)
Lee Schroer, OGC (2355)

TMDL: Spokane River, Washington
Effective Date: July 16, 1999

REVIEW ELEMENTS OF TMDL's

Section 303(d) of the Clean Water Act (CWA) and EPA's implementing regulations at 40 C.F.R. Part 130 describe the statutory and regulatory requirements of TMDLs. The following information is generally necessary for EPA to determine if a submitted TMDL fulfills the legal requirements for approval under Section 303(d) and EPA regulations. When the information listed below uses the verb "must", this denotes information that is required for EPA to review the elements of the TMDL required by the CWA and regulation.

Comment: *Two documents were submitted for review—Spokane River Dissolved Metals Total Maximum Daily Load, Submittal Report and Cadmium, Lead, and Zinc in the Spokane River, Recommendations for Total Maximum Daily Loads and Waste Load Allocations. When referencing the documents in this review, they will be referred to as "Submittal Report" and "Recommendations Report," respectively.*

1. Description of Waterbody, Pollutant of Concern, Pollutant Sources and Priority Ranking

A cover memo should describe the waterbody as it is identified on the State's section 303(d) list, the pollutant of concern and the priority ranking of the waterbody. The TMDL submittal must include a description of the point, nonpoint, and natural background sources of the pollutant of concern, including the magnitude and location of the sources, because this information is necessary for EPA to review the load and wasteload allocation which are required by the regulation. The TMDL submittal should also contain a description of any important assumptions, such as: (1) the assumed distribution of land use in the watershed; (2) population characteristics, wildlife resources, other relevant characteristics affecting the characterization of the pollutant of concern and the allocation, as applicable; (3) present and future growth trends, if this is a factor that was taken into consideration in preparing the TMDL: (4) explanation and analytical basis for expressing the TMDL through *surrogate measures*, if applicable.

Comment: *A TMDL was developed for three dissolved metals (cadmium, zinc, and lead) in the Washington State portion of the Spokane River. The primary source of these metals is at the origin of the river in Coeur d'Alene Lake, Idaho. Elevated metals levels in the lake are due to historic and ongoing mining activities in the lake basin.*

Secondary sources include POTW's in Idaho and Washington, tributary streams and groundwater inflow to the river. Background information on the waterbody, impairment, watershed and pollutants of concern are included with summary descriptions of land use, climate and pollutant sources on p 3-4 in the Submittal Report. Description of the priority ranking of Spokane River was not included.

2. Description of the Applicable Water Quality Standards and Numeric Water Quality Target

The TMDL submittal must include a description of the applicable State water quality standard, including the designated use(s) of the waterbody, the applicable numeric or narrative water quality criterion, and the antidegradation policy, because this information is necessary for EPA to review the load and wasteload allocation which are required by the regulation. A numeric water quality target for the TMDL (a quantitative value used to measure whether or not the applicable water quality standard is attained) must be identified. If the TMDL is based on a target other than a numeric water quality criterion, a description of the process used to derive the target must be included in the submittal.

Comment: *Chronic aquatic toxicity standards for dissolved concentrations of each of the metals, incorporating the effects of hardness, was used as the regulatory basis for TMDL development. Water quality standards, including designated uses and water quality criteria for cadmium, lead and zinc are included in the Submittal Report (p 4-5) and the Recommendations Report (p 3-4).*

3. Loading Capacity - Linking Water Quality and Pollutant Sources

As described in EPA guidance, a TMDL describes the loading capacity of water for a particular pollutant. EPA regulations define loading capacity as the greatest amount of loading that a water can receive without violating water quality standards (40 C.F.R. § 130.2(f)). The TMDL submittal must describe the rationale for the analytical method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources. In may circumstances, a *critical condition* must be described and related to physical conditions in the waterbody (40 C.F.R. § 130.7(c)(1)). Supporting documentation for the analysis must also be included, including the basis for assumptions, strengths and weaknesses in the analytical process, results from water quality modeling, etc, so that EPA can properly review the statutory and regulatory required elements of the TMDL.

Comment: *A mass balance model of the Spokane River was developed to evaluate the effect of different effluent loading on metals and hardness. The model includes flow balance that accounts for inflow of water from the outlet of Lake Coeur d'Alene, inflow from NPDES dischargers, and inflow/outflow from the aquifer and Hangman Creek. To establish the relationship between effluent discharge and receiving water quality, and to eventually allocate loads among the POTW's along the Washington portion of the river, a steady state flow and mass balance model was used. The flow model accounts for river discharge at the Idaho-Washington border and tributary, POTW, and groundwater inflows to the river in Washington. Corresponding mass balance equations are used for total cadmium, lead and zinc concentrations and for hardness. Dissolved metals concentrations are determined using a conservative estimate of the dissolved to total fraction. Since this study does not develop TMDL's for the Idaho portion of the river, the metals concentration at the rivers headwater discharge from Coeur d'Alene Lake are taken as the chronic toxicity concentrations at the corresponding discharge hardness. The steady state mass balance model was used to simulate low and high flow conditions, corresponding to 300 and 20,000 cfs discharges from the Lake. Hardness of the Lake discharge was conservatively estimated using the 10th percentile values for each flow rate with metals toxicity concentrations corresponding determined. Estimated metals concentrations and hardness for the groundwater inflow to the river were adjusted within reasonable ranges to calibrate the metals and hardness mass balances. Total metals loads and hardness for the POTW were based on 90th and 10th percentile values, respectively. The mass balance for metals does not include deposition and resuspension of sorbed metals. This was justified by arguing that at the low flow rate, sediment concentration is corresponding low and only a small portion of the total metals transport in the river is associated with the sediment sorbed phase. At the high flow rate, deposition of sediment sorbed metals will be negligible and due to bed armoring, little resuspension is expected to occur. The linkage methodology and associated assumptions are discussed on pp. 4-8 in the Recommendations Report. It is indicated in the table of contents that the modeling approach is discussed on p. 8 of the Submittal Report; however, pp. 8 & 9 are not included the reviewed copy of the Submittal Report.*

Critical conditions were considered in the modeling analysis, as indicated on p. 10 of the Submittal Report. However, it is recommended that the discussion be expanded to more clearly explain the critical conditions used and the rationale behind them.

4. Load Allocations (LAs)

EPA regulations require that a TMDL include LAs, which identify the portion of the loading capacity allocated to existing and future nonpoint sources and to natural background. 40 C.F.R. § 130.2(h). Load allocations may range from reasonably accurate estimates to gross allotments. 40 C.F.R. § 130.2(g). Where it is possible to separate natural background from nonpoint sources, separate load allocations should be made and described. If there are no nonpoint sources and/or natural background, or the TMDL recommends a zero load allocation, an explanation must be provided. The TMDL may recommend a zero LA if the State determines, after considering all pollutant sources, that only allocating to point sources will still result in attainment of the applicable water quality standard.

Comment: *The LA is <u>not</u> specifically identified in the Recommendations Report. It is indicated in the text that the LA would be set at the Idaho-Washington border to account for metals loading from Coeur d'Alene Lake in Idaho and would be expressed as a concentration equal to the water quality standards. However, the analysis assumed a concentration at the border equal to the water quality standards. The analytical document seems to indicate that it was assumed that the river would meet water quality standards without the addition of NPDES discharges and the analysis only addresses point sources and WLAs. Although aquifer sources and concentrations were included in the modeling analysis, it seems that no other nonpoint or background sources were considered in this analysis and no LAs were calculated. The discussion of nonpoint and background sources and their associated LAs should be clarified, including a description of any nonpoint source loads that were considered in the analysis and quantification of LAs for any nonpoint sources considered, including groundwater inputs. Further discussion is needed to clarify whether sources such as stormwater runoff and inchannel sediments were evaluated as sources of metals to the river.*

It is indicated in the table of contents of the Submittal Report that LAs are discussed on p. 9; however, pp. 8 & 9 are not included in the reviewed copy of the Submittal Report.

5. Wasteload Allocations (WLAs)

EPA regulations require that a TMDL include WLAs, which identify the portion of the loading capacity allocated to existing and future point sources. 40 C.F.R. § 130.2(g). If no point sources are present or the TMDL recommends a zero WLA for point sources, the WLA must be listed as zero. The TMDL may recommend a zero WLA if the State determines, after considering all

pollutant sources, that only allocating to nonpoint sources will still result in attainment of the applicable water quality standard. In preparing the Wasteload Allocation, it is not necessary that every individual point source have a portion of the allocation of pollutant loading capacity. But it is necessary to allocate the loading capacity among individual point sources as necessary to meet the water quality standard. The TMDL submittal should also discuss whether a WLA is based on an assumption that loads from a nonpoint source or sources will be reduced. In such cases, the State will need to demonstrate reasonable assurance that the nonpoint source reductions will occur within a reasonable time.

Comment: *Quantified WLAs are not included in the Recommendations Report. The section on WLAs (pp. 8-14) discusses the approach for calculation of WLAs for NPDES dischargers, rather than actually calculating the WLAs. The proposed approach for WLA calculation is to establish loads as an end-of-pipe maximum discharge concentration (rather than a loading of mass/time). Equations are provided to determine the appropriate metal concentration based on effluent hardness. It is indicated in the text that the maximum concentration would be equal to the chronic aquatic life criteria (ALC) for cadmium and zinc (p. 9; ALC is discussed on p. 4); and would be estimated for lead from the point on a line tangent to the lead criterion curve (intersecting the curve at the river hardness value), as discussed on p. 9 and in Figure 4. This discussion, together with a description of Figures 2 and 3 (p. 4) indicate that if river concentrations for zinc and cadmium are below the water quality criteria, effluent concentrations at or below water quality criteria concentrations will result in maintenance of water quality standards in Spokane River. These discussions also indicate that the nature of the lead criterion curve (in relation to hardness) is such that a mixture of waters individually meeting the criterion may actually exceed the water quality criterion. These relationships or "rules" are established as approaches to determine the equations for calculation of WLA. (An example calculation is provided on p. 11 of the Recommendations Report.) It is also indicated that the WLA would be set at the existing ("performance-based") concentrations, if more restrictive. (Performance-based limits can only be evaluated with a sufficient amount of data, p. 10.) However, these "rules" are not specifically applied to dischargers to the Spokane River. WLAs are not quantified for each discharger. Although indicated elsewhere in the text, it should be stated that the application of these "rules" and equations will be appropriate in that, when applied to all dischargers, they result in the attainment of water quality standards. It would be helpful to include a list of permitted dischargers and facility and permit information in this section.*

The table of contents in the Submittal Report indicate that WLAs are discussed on p.

9; however, pp. 8 & 9 are not included the reviewed copy of the Submittal Report.

6. Margin of Safety (MOS)

The statute and regulations require that a TMDL include a margin of safety to account for any lack of knowledge concerning the relationship between effluent limitations and water quality. CWA 303(d)(1)(C), 40 C.F.R. § 130.7(c)(1). EPA guidance explains that the MOS may be implicit, i.e., incorporated into the TMDL through conservative assumptions in the analysis, or explicit, i.e., expressed in the TMDL as loadings set aside for the MOS. If the MOS is implicit, the conservative assumptions in the analysis that account for the MOS must be described. If the MOS is explicit, the loading set aside for the MOS must be identified.

Comment: *MOS was included implicitly in the analysis through the use of conservative assumptions (p. 10 in the Submittal Report).*

7. Seasonal Variation

The statute and regulations require that a TMDL be established with seasonal variations. The method chosen for including seasonal variations in the TMDL must be described. CWA 303(d)(1)(C), 40 C.F.R. § 130.7(c)(1).

Comment: *A seasonal analysis of metals concentrations in the river is presented on p. 7 of the Submittal Report, but it does not provide an explanation of how the seasonal variation is used in the TMDL analysis. It is indicated that seasonal variations in hardness or metal concentrations are related to seasonal flows, and the discussion of MOS indicates that assumptions on the critical conditions and the modeling approach includes hardness levels based on seasonal flows. It appears that seasonal variation was accounted for and represented in the analysis, but further discussion is need in this section to clarify the inclusion of and effects on the modeling of seasonal variations.*

8. Monitoring Plan for TMDLs Developed Under the Phased Approach

EPA's 1991 document, *Guidance for Water Quality-Based Decisions: The TMDL Process* (EPA 440/4-91-001), calls for a monitoring plan when a TMDL is developed under the phased approach. The guidance provides that a TMDL developed under the phased approach also needs to provide

assurances that nonpoint source control measures will achieve expected load reductions. The phased approach is appropriate when a TMDL involves both point and nonpoint sources and the point source WLA is based on a LA for which nonpoint source controls need to be implemented. Therefore, EPA's guidance provides that a TMDL developed under the phased approach should include a monitoring plan that describes the additional data to be collected to determine if the load reductions required by the TMDL lead to attainment of water quality standards.

Comment: *P. 11 in the Submittal Report indicates that the TMDL will be monitored through monitoring required under NPDES discharge permits. Discussion of data needs for evaluating existing effluent concentrations is included on p. 10 of the Recommendations Report. More than 10 samples are required to estimate effluent variability. Therefore, the recommended minimum sampling frequency is monthly sampling for at least 12 months to provide sufficient data to estimate effluent metals concentrations. The discussion also includes appropriate sample analysis methods.*

9. Implementation Plans

In August 8, 1997, Bob Perciasepe issued a memorandum, "New Policies for Establishing and Implementing Total Maximum Daily Loads (TMDLs)," that directs Regions to work in partnership with States to achieve nonpoint source load allocations established for 303(d)-listed waters impaired solely or primarily by nonpoint sources. To this end, the memorandum asks that Regions assist States in developing implementation plans that include reasonable assurances that the nonpoint source load allocations established in TMDLs for waters impaired solely or primarily by nonpoint sources will in fact be achieved; a public participation process; and recognition of other relevant watershed management processes. Although implementation plans are not approved by EPA, they help establish the basis for EPA's approval of TMDLs.

Comment: *P. 10 of the Submittal Report indicates that implementation will rely on control of sources in Idaho. It indicates that effluent limits will be included in NPDES permits when adequate data exist and that further monitoring will be conducted to collect sufficient data to calculate WLAs for facilities that currently don't have adequate data. (Discussion of data needs for evaluating existing effluent concentrations is included on p. 10 of the Recommendations Report. More than 10 samples are required to estimate effluent variability. Therefore, the recommended minimum sampling frequency is monthly sampling for at least 12 months to provide sufficient data to estimate effluent metals concentrations. The discussion also includes appropriate sample analysis methods.)*

10. Reasonable Assurances

EPA guidance calls for reasonable assurances when TMDLs are developed for waters impaired by both point and nonpoint sources and for waters impaired solely by nonpoint sources. In a water impaired by both point and nonpoint sources, where a point source is given a less stringent wasteload allocation based on an assumption that nonpoint source load reductions will occur, reasonable assurance must be explained in order for the TMDL to be approvable, because this information is necessary for EPA to review the load and wasteload allocation which are required by the regulation.

In a water impaired by solely by nonpoint sources, however, reasonable assurances are not required in order for a TMDL to be approvable. For such nonpoint source-only waters, States are encouraged to provide reasonable assurances regarding achievement of load allocations in the implementation plans described in section 7, above. As described in the August 8, 1997 Perciasepe memorandum, such reasonable assurances should be included in State implementation plans and "may be non-regulatory, regulatory, or incentive-based, consistent with applicable laws and programs."

Comment: *Implementation of loadings will be done through the NPDES program. The text indicates that dischargers that do not have adequate data to determine WLA limits for their NPDES permits will be required to initiate monthly low-level monitoring. All dischargers will have the TMDL limits placed in their permits within 2.5 years from initiation of that monitoring. (P. 11 of Submittal Report.)*

11. Public Participation

EPA policy is that there must be full and meaningful public participation in the TMDL development process. Each State must therefore provide for public participation consistent with its own public participation requirements. In guidance, EPA has explained that final TMDLs submitted to EPA for review and approval must describe the State's public participation process, including a summary of significant comments and the State's responses to those comments. When EPA establishes a TMDL, EPA regulations require EPA shall publish a notice seeking public comment. 40 C.F.R. § 130.7(d)(2).

Inadequate public participation is not a basis for disapproving a TMDL; however, where EPA determines that a State has not provided adequate public participation, EPA may defer its approval action until adequate public participation has occurred, either by the State or by EPA.

Comment: *Public participation was included in this analysis. Public participation materials, including newspaper ads, mailing list, public workshop attendee list and response to comments are included in the appendices of the Submittal Report.*

12. Submittal Letter

A submittal letter should be included with the TMDL analytical document, and should specify whether the TMDL is being submitted for a *technical review* or is a *final submittal.* Each final TMDL submitted to EPA must be accompanied by a submittal letter that explicitly states that the submittal is a final TMDL submitted under § 303(d) of the Clean Water Act for EPA review and approval. This clearly establishes the State's intent to submit, and EPA's duty to review, the TMDL under the statute.

Comment: A submittal letter was <u>not</u> included with the documents provided for review.

13. Other Comments:

The analytical document should be revised to identify the priority rating of the 303(d) listed waterbody.